

CLAIMS

1. (Currently Amended) A method for packaging ~~at least one microscopic~~ a device, comprising:

applying a sacrificial material to ~~at least one microscopic~~ the device;

applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;

creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material, the apertures having a size and shape such that a removing material is able to pass through at least one of the apertures but a protective material cannot pass through the apertures;

removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains;

depositing [[a]] the protective material adjacent the housing of structural material overlaying at least one of the apertures ~~of the housing~~ in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the ~~microscopic~~ device; and curing the protective material.

2. (Original) The method of Claim 1, wherein the method further comprises:
providing a gas atmosphere, wherein the pressure is greater than or equal to 1 Pascal (Pa);
and

providing a temperature of less than 600° Celsius (C).

3. (Original) The method of Claim 2, wherein the sacrificial material has a higher etch rate than the structural material.

4. (Original) The method of Claim 3, wherein the sacrificial material comprises either a photoresist or a polyimide material.

5. (Original) The method of Claim 2, wherein the structural layer is selected from a group of Silicon Dioxide (SiO₂) and Silicon Nitride (Si₃N₄).

6. (Original) The method of Claim 2, wherein the step of removing portions of the structural layer comprises use of sputter etching or ion beam milling.

7. (Original) The method of Claim 2, wherein the step of removing the sacrificial layer comprises use chemical etching.

8. (Original) The method of Claim 2, wherein the step of removing the sacrificial layer comprises use of either plasma ashing or plasma etching.

9. (Original) The method in Claim 2, wherein the step of depositing a protective material comprises wicking the protective material into at least one aperture of the housing.

10. (Original) The method of Claim 2, wherein the step of depositing the protective material comprises applying the protective material to at least a portion of the surface of the housing and allowing the protective material to flow into at least a portion of an aperture in the housing.

11. (Original) The method of Claim 2, wherein the step of applying a layer of material comprises forming a structural layer having a thickness of between about 0.2 microns and about 20 microns.

12. (Original) The method of Claim 2, wherein the step of applying a sacrificial material comprises forming a sacrificial layer having a thickness of between about 0.2 microns and about 10 microns.

13-23. (Canceled)

24. (Currently Amended) A method for packaging ~~at least one microscopie a~~ device having at least one movable region, comprising:

forming a housing over the device, the housing having with at least one aperture ~~over the microscopie device, the aperture having a size and shape such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture;~~

depositing [[a]] the protective material adjacent at least a portion of the housing, wherein the protective material at least flows into the at least one aperture ~~of the housing~~, sealing the aperture in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the ~~microscopie~~ device; and
curing the protective material.

25. (Currently Amended) The method of Claim 24 wherein the step of forming of the housing with at least one aperture further comprises:

applying a sacrificial material to ~~at least one microscopie the~~ device;

applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;

creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material; and

removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains.

26. (Original) The method of Claim 25, wherein the sacrificial layer has a higher etch rate than the structural material.

27. (Original) The method of Claim 26, wherein the sacrificial material comprises either a photoresist or a polyimide material.

28. (Original) The method of Claim 25, wherein the structural layer is selected from a group of Silicon Dioxide (SiO_2) and Silicon Nitride (Si_3N_4).

29. (Original) The method of Claim 25, wherein the step of removing portions of the structural layer is at least configured to use sputter etching or ion beam milling.

30. (Original) The method of Claim 25, wherein the step of removing the sacrificial layer is at least configured to use chemical etching.

31. (Original) The method of Claim 25, wherein the step of removing the sacrificial layer is at least configured to use plasma ashing or plasma etching.

32. (Original) The method of Claim 25, wherein the step of applying a structural material comprises forming a structural layer between 0.2 microns and 20 microns thick.

33. (Original) The method of Claim 25, wherein the step of applying a sacrificial material comprises forming a sacrificial layer is between 0.2 microns and 10 microns thick.

34-43. (Canceled)

44. (Currently Amended) A method for packaging ~~at least one microseopic~~ a device having at least one movable region, comprising:
determining a shape and size for an aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture;
forming a housing over the device, the housing having with at least one aperture with the determined size and shape over the at least one microseopic device;
depositing [[a]] the protective material adjacent at least a portion of the housing, wherein the protective material flows at least partially into the at least one aperture of the housing, sealing the aperture and is an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the microseopic device, and
curing the protective material.

45. (Currently Amended) The method of Claim 44 wherein the forming of the housing with at least one aperture further comprises:
- applying a sacrificial material to ~~at least one microscopic~~ the device;
 - applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;
 - creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material; and
 - removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains.
46. (Original) The method of Claim 45, wherein the sacrificial layer has a higher etch rate than the structural material.
47. (Original) The method of Claim 46, wherein the sacrificial material comprises either a photoresist or a polyimide material.
48. (Original) The method of Claim 45, wherein the structural layer is selected from a group of Silicon Dioxide (SiO_2) and Silicon Nitride (Si_3N_4).
49. (Original) The method of Claim 45, the step of removing portions of the structural layer is at least configured to use sputter etching or ion beam milling.
50. (Original) The method of Claim 45, wherein the step of removing the sacrificial layer is at least configured to use chemical etching.
51. (Original) The method of Claim 45, wherein the step of removing the sacrificial layer is at least configured to use plasma ashing or plasma etching.
52. (Original) The method of Claim 45, wherein the step of applying a structural material comprises forming a structural layer between 0.2 microns and 20 microns thick.

53. (Original) The method of Claim 45, wherein the step of applying a sacrificial material comprises forming a sacrificial layer is between 0.2 microns and 10 microns thick.

54-63. (Canceled)

64. (Currently Amended) A method for packaging ~~at least one microscopie a~~ device, comprising:

providing a gas atmosphere, wherein the pressure is greater than or equal to 1 Pascal (Pa);

providing a temperature of less than 600° Celsius (C);

forming a housing over the device, the housing having ~~with~~ at least one aperture ~~over the at least one microscopie device;~~

forming the shape and size of the aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture;

depositing ~~[[a]]~~ the protective material adjacent to the housing in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the ~~microscopie~~ device; and

curing the protective material.

65. (Canceled)

66. (Currently Amended) A method for packaging ~~at least one microscopic a~~ device having at least one movable region, comprising:

~~forming a housing over the device, the housing having with at least one aperture over the at least one microscopic device;~~

~~forming the shape and size of the aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture;~~

placing ~~[[a]] the~~ protective material adjacent to at least a portion of the housing forming a protective layer on the housing, wherein the protective material extends from about at least partially into ~~the~~ at least one aperture ~~of the housing~~ in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the ~~microscopic~~ device; and

allowing or causing the protective layer to harden.

67. (Canceled)

68. (Currently Amended) A method for packaging ~~at least one microscopic a~~ device, comprising:

applying a sacrificial material to ~~at least one microscopic~~ the electromechanical device;

applying a layer of structural material adjacent the sacrificial material, the layer of structural material forming a housing adjacent at least a portion of the sacrificial material;

creating one or more apertures in the housing of structural material to expose at least a portion of the adjacent sacrificial material, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture;

removing the sacrificial layer, wherein the housing of structural material with at least one aperture remains;

depositing ~~[[a]] the liquid phase~~ protective material adjacent the housing of structural material overlaying at least one ~~of the one or more~~ apertures of the housing in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the microscopic device; and

curing the protective material.

69. (Currently Amended) A method for packaging ~~at least one microscopie~~ a device having at least one movable region, comprising:

~~forming a housing over the device, the housing having with at least one aperture over the microscopie device;~~

~~forming the shape and size of the aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture~~

depositing ~~[[a]] the liquid-phase~~ protective material adjacent at least a portion of the housing, wherein the protective material at least flows into ~~the~~ at least one aperture ~~of the housing~~, sealing the aperture in an amount sufficient to substantially close the aperture without entering the housing sufficiently to interfere with operation of the at least one movable region of the ~~microscopie~~ device; and

curing the protective material.

70. (New) A method for packaging a device, the method comprising:

forming a housing over the device, the housing having at least one aperture; and

forming the shape and size of the aperture, such that a removing material is able to pass through the aperture but a protective material cannot pass through the aperture.

71. (New) The method of Claim 70 further comprising:

removing a sacrificial material from within the housing through the at least one aperture,

72. (New) The method of Claim 71 wherein removing a sacrificial material comprises at least one selected from the list consisting of:

sputter etching, ion beam milling, chemical etching, plasma ashing, and plasma etching.

73. (New) The method of Claim 70 further comprising:

depositing the protective material adjacent to the housing.

74. (New) The method of Claim 70 further comprising:
providing a gas atmosphere, wherein the pressure is greater than or equal to 1 Pascal (Pa);
and
providing a temperature of less than 600° Celsius (C).

75. (New) The method of Claim 70 further comprising:
depositing a layer of structural material, wherein the structural material has a lower etch rate
than the sacrificial material.

76. (New) The method of Claim 70 further comprising:
depositing a layer of sacrificial material, wherein the sacrificial material comprises at least
one selected from the list consisting of:
a photoresist and a polyimide material.

77. (New) The method of Claim 70 further comprising:
depositing a layer of conductive material.

78. (New) The method of Claim 77 wherein depositing a layer of conductive material
comprises depositing a protective material adjacent to the housing.

79. (New) The method of Claim 70 wherein determining a shape and size comprises
determining a shape and size for an aperture such that a surface tension of the removing material
enables the removing material to pass through at least one of the one or more apertures but a surface
tension of the covering material prevents the covering material from passing through the one or
more apertures.

80. (New) A method for packaging a device, the method comprising:
covering the device with a sacrificial material;
covering the sacrificial material with a housing of structural material;
determining a shape and size for an aperture such that a removing material, having a first viscosity, is able to pass through the aperture but a protective material, having a second viscosity, cannot pass through the aperture; and
creating, in the housing, one or more apertures having the determined size and shape.